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SEP 13 1973

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## ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

## Bark Beetle Emergence Cages Modified for Use as Pit Traps

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Bark beetle emergence cages collect numerous ground dwelling insects when modified for use as pit traps.

Oxford: 453:413.1. Keywords: Insect traps.

In 1967 Germain and Wygant<sup>3</sup> designed a collecting device consisting of a cylindrical screen cage over a funnel to capture emerging bark beetles. In use, an infested bolt is placed within the screen cylinder and emerging *Dendroctonus* beetles and other insects eventually fall into a jar attached to the funnel spout. These cages have been used extensively in laboratory rearings and work well with either naturally or artificially infested bolts.

We recently modified these cages for use as pit traps. The leg stands and screening were separated from the funnel and stored. A rectangular piece of sheet metal was soldered to form a cylinder slightly larger than the outside diameter of the upper portion of the funnel, so that the funnel fitted snugly into the cylinder and its lip rested on the edge of the cylinder. At the collection site, the sheet metal cylinder and funnel were placed in a hole dug just wide enough to accommodate the cylinder and deep enough to have the lip of the funnel level with the ground (fig. 1). Loose soil was backfilled



Figure 1.—Pit trap in collecting position.

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<sup>3</sup>Germain, C. J., and N. D. Wygant. 1967. A cylindrical screen cage for rearing bark beetles. U. S. For. Serv. Res. Note RM-87, 4 p. Rocky Mt. For. and Range Exp. Stn., Fort Collins, Colo.



around the cylinder and leveled to the top of the funnel. Any soil falling into the cylinder during backfilling was removed to allow room for the jar at the bottom of the funnel.

A standard canning jar—half-filled with alcohol—was attached to the funnel (fig. 2) which was then inserted in the cylinder. The metal bolts which normally support beetle-infested bolts were left in place to serve as handles for removing the funnel from the cylinder. The collecting jars can be changed rapidly, and evaporation of alcohol is negligible. If the emergence cages are needed for bark beetle studies, the funnels can easily be reassembled with the other parts. Since the emergence cages are not extensively used in spring and early summer for bark beetle rearings, the funnel portion can serve in both capacities.

People who do not have access to a Germain-Wygart cage can easily and inexpensively construct their own trap. The parts can be purchased and assembled for approximately \$5 (10-inch diameter funnel = \$3, sheet metal, bolts, and jar = \$1, soldering = \$1) if a 10-inch diameter funnel is used and labor is not included. Funnel size is optional, although smaller funnels may be less effective because their smaller necks may clog or prevent the larger insects, spiders, or small mammals from falling into the jar.

Adult insects collected during the 1972 field season included specimens of Carabidae, Cantharidae, Cerambycidae, Cicindelidae, Coccinellidae, Curculionidae, Elateridae, Scarabaeidae, Silphidae, Staphylinidae, and

Tenebrionidae. Also collected were adults of the families Acrididae, Gryllidae, Lygaeidae, Asilidae, Calliphoridae, Muscidae, Tabanidae, Tachinidae, Apidae, Chrysidae, Formicidae, Ichneumonidae, and Mutillidae. Although adults were most numerous, larvae of some groups were also taken.

Most of the insects probably fell into the traps. Exceptions seem to be the ichneumonids and asilids which were probably overcome by alcohol fumes while searching the neck of the funnel for prey or oviposition sites. Other Diptera may have suffered a similar fate.

In addition to insects, the traps also collected numerous arachnid families including: Clubionidae, Dictynidae, Gnaphosidae, Hahniidae, Linyphiidae, Lycosidae, Micryphantidae, Salticidae, Theridiidae, and Thomisidae.

Throughout the trapping period, several species of small mammals, both young and old, were found in the traps. These were believed to have fallen in accidentally while foraging. Species trapped included: masked shrew (Sorex cinereus Kerr), vagrant shrew (Sorex vagrans Baird), Richardson ground squirrel (Citellus richardsoni (Sabine)), northern pocket gopher (Thomomys talpoides (Richardson)), Wyoming pocket mouse (Perognathus fasciatus Maximilian), deer mouse (Peromyscus maniculatus (Wagner)), grasshopper mouse (Onychomys leucogaster (Maximilian)), mountain vole (Microtus montanus (Peale)), longtailed vole (Microtus longicaudus (Merriam)), and sagebrush vole (Lagurus curtatus (Cope)).



Figure 2.—Pit trap ready for insertion into the cylinder.